Colorado Bembicidae.

By S. A. Johnson and S. A. Rohwer.

The main object of this paper is to give the distribution, within the State, of the species which are known to occur here, and to add a few species which have hitherto not been reported. The notes are based principally on the collection of the Colorado Agricultural College, but a few species have been taken by the junior author.

To make the paper more complete, tables to separate the genera and species are offered.

The family may be separated into two distinct subfamilies as follows:

STIZINÆ.

Marginal cell much longer than the first cubital; species large.

Sphecius Dahlb.

SPHECIUS Dahlb.

This is a small genus, containing but four species in the United States. These are all southern forms. There is but one species known from Colorado, *S. speciosus* Drury. We have two females and a male from Las Animas, Col., August 17, 1901. The thorax is rufous.

STIZUS Latr.

r. Wings mostly blue-black; first and second transverse cubiti meeting, or nearly so, on the radial; second dorsal abdominal segment with a rufous band, other segments black. . . unicinctus Say.

Wings hyaline; first and second transverse cubiti distinctly separated on radial; abdomen with many pale spots or bands.

Stizus (Megastizus) unicinctus Say.

We have not seen this species. It is recorded from Colorado by Cresson (cat.), and Ashmead (Colo. list).

Stizus (Megastizus) brevipennis Walsh.

We have a male of this species from Ft. Lupton, Colorado, July 22, 1900.

Stizus (Stizus) subalpinus Ckll.

This was described as a variety of *flavus* Cam., but inasmuch as all the northern ones are as pale as *subalpinus*, it may be called a species, Two males, Ft. Collins, Col., Aug. 7, 1904.

Stizus (Stizus) godmani Cam.

Two males, Boulder, Col. Aug. 30, 1907, fls. of *Helianthus pumilis* (Roh.). This species is common at Las Cruces, New Mexico. We have seen many specimens collected by C. H. T. Townsend from flowers of *Solidago canadensis*.

BEMBICINÆ.

2. Anterior ocellus linear; maxillary palpi 4-jointed, labial palpi 2-jointed.

Bember Fabr.

Anterior ocellus round or elliptic; palpi otherwise 3.
3. Maxilla long; reaching hind coxæ; maxillary palpi 3-jointed, labial palpi 1-jointed; anterior ocellus elliptic . . . Steniolia Say.

Maxilla short; maxillary palpi 6-jointed, labial palpi 4-jointed; anterior ocellus round or reniform Stictia Illiger.

MICROBEMBEX Patt.

This genus is quite distinct. There is apparently but one species known, but it has at least five distinct forms, some of which may at a later time be raised to specific value. They may be separated as follows:

Posterior face of metathorax without a pale spot on each side, or with
a very small one; spot on pleura small or wanting; no lines
on the mesonotum monodonta.

Venter black, except a small spot on each side of second and third segments; band on first abdominal segment dentate in middle; markings greenish or pale yellowish.

monodonta neomexicana.

Venter with much more yellow
3. Mandibles black; scape entirely black; pectus not margined with
yellow monodonta deltaensis.
Mandibles yellow; scape in front yellow; pectus margined with yel-
low monodonta argentifrons.

Microbembex monodonta monodonta Say.

This subspecies seems to be eastern. The female described by Patton (p. 362, v, Bull. U. S. Geol. Survey) was from Connecticut. We have a male and female from New Jersey. The mark on the pleura is wanting in both of these. Patton (loc. cit., p. 363) describes the specimens from Kansas as differing from the eastern ones in much the same way as occidentalis differs from monodonta.

Microbembex monodonta occidentalis subsp. n.

The characters in the above table will separate this subspecies from *monodonta monodonta* its nearest ally. The markings in all the specimens before us are greenish. The silvery pile is usually quite dense. We have specimens from Paris, Tex. (C. R. Jones), and Colo.

Microbembex monodonta neomexicana subsp. n.

This subspecies seems quite distinct. The dentation of the first abdominal band, the mostly black venter, the yellow clypeus and labrum make it easily recognized. The markings vary from greenish-white to pale yellow. On the average it is smaller than the two preceding subspecies. Many specimens from Las Cruces New Mexico, August 30th, at flowers of Solidago canadensis (C. H. T. Townsend).

Microbembex monodonta deltaensis subsp. u.

The table will separate this from the other subspecies. The markings are lemon-yellow. The sides of the venter beyond the second segment, and the second ventral segment except

the spine are yellow. The abdomen above is mostly yellow. The pale markings on the head and thorax are large. Length 10 mm. Many male specimens from Delta, Colo., July 29, 1898.

Microbembex monodonta argentifrons Cress.

This subspecies was described as a distinct species from Cuba by Mr. Cresson.

BEMBIDULA Burm.

This genus is not well represented in Colorado, there being but two species, but an apparently new one is added here. It is from New Mexico. The table is based on the males.

Smaller (about 14 mm.); postscutellum marked with yellow; spots of abdomen not or but little wider at the sides, spot on all the segments narrowly separated in the middle

I. Clypeus black; punctures of dorsulum close; tibiae with a black stripe; bands on abdomen rather narrow . . . ventralis Say.

Bembidula ventralis Say.

Female, Cope, Colo., Aug. 19, 1905 (S. A. Johnson).

Bembidula quadrifasciata Say.

Female without a label, but probably from Ft. Collins, Colo., having been picked up by a student.

Bembidula meliloti Roh., n. sp.— \S . Length about 14 mm.; clypeus finely closely punctured, along the anterior margin are a few larger punctures; mandibles with two rather small teeth within; front punctured similar to clypeus; first joint of the flagellum a little longer than 2+3; apical joints slightly produced beneath; apical joint obliquely truncate; dorsulum punctured with rather large punctures, which are separated (not widely so, however) on the posterior part, the anterior part and near tegulæ they are closer; scutellum punctured like posterior part of dorsulum, if anything, more sparsely so; mesopleura with large, separate punctures; metathorax sculptured like scutellum, or perhaps the punctures are a little closer; angles broadly, obtusely rounded; first joint of anterior tarsi emarginate at base beneath; middle femora with a strong, stout spine at base beneath; abdomen distinctly reticulate, apical

segment with large, strong punctures; spines long, obtusely pointed, lateral ones curved; stipes of the genitalia broad, somewhat the shape of a knife-blade, but not very sharply pointed; at apex and sides with a strong fringe of hairs; ventral segments beyond first with some large punctures among the close fine ones. Black: spot on base of mandibles, large transverse, irregular spots on clypeus, inner orbits for two-thirds of the way above clypeus, narrow line on lower two third of posterior orbits, palpi, line on pronotum, tubercles, tegulae, a line above, spot on each side of scutellum, line on postscutellum, angles of metathorax, legs below about the middle of femora, broad bands on dorsal abdominal segments 1-6, usually narrowly interrupted in middle, small spot on each side of seventh dorsal segment, spots on sides of ventral segments 2-5, vellow or greenish-white: the color of the legs is bright yellow, the other markings are more or less greenish; stripes of genitalia reddish-yellow; wings yellowish hyaline, nervures brown; head and thorax with white pubescence, that on the head the longest; in one wing the second tr. cu. is wanting.

Hab.—Pecos, New Mexico, Sept. 211d, at fls. of Melilotus alba (Ckll.).

This species is close to *B. ventralis* Say, but may be known from it by the characters given in the above table, and in having the first joint of anterior tarsi emarginate at base beneath.

BEMBEX Fabr.

Males.

Mates.
Prominence of sixth ventral segment bifid at apex amoena Hdl.
Prominence of sixth ventral segment simple at apex
I. Dorsulum spotted sayi Cress.
Dorsulum not spotted, or at least not notably so
2. Markings of abdomen bright yellow; femora yellow, except base
sometimes; larger (20 mm.)nubilipennis Cress.
Markings of abdomen greenish-white; femora largely black; smaller. spinolae St. Farg.
Females.
Metathorax with a good deal of yellow; larger
Metathorax black, or with a little yellow; smaller
I. Wings at base clouded nubilipennis Cress.
Wings hyaline sayi Cress.
2. Pleura black, without spots; bands of abdomen continuous.
spinolae St. Farg.
Pleura spotted
3. Bands of abdomen separated; mesopleura with two spots.
amoena Hdl.
Bands of abdomen continuous; mesopleura with one large spot 4.

4. Length 20 mm.; abdomen hardly pubescent (Utah) . . connexus Fox. Length 14 mm.; abdomen distinctly pubescent . . primaaestate n. sp.

Bembex nubilipennis Cress.

Male, Rocky Ford, Colo., July 4, 1904; female, labeled "F. F. C."

Bembex sayi Cress.

Female, Salida, Colo., Oct. 3, 1898; 2 females, Cope, Colo., Aug. 9, 1905 (S. A. Johnson).

Bembex amoena Hdl.

Male, Alamosa, Colo., Aug. 6, 1903; male, Rocky Ford, Colo., July 4, 1904.

Bembex spinolae St. Farg.

Two females, Pueblo, Colo., Aug. 10, 1907 (Hite); female, Sept. 12, 1907, fls. *Chrysothamnus graveolens*, also Oct., 6, 1907, Boulder, Colo. (Roh.). The Boulder ones have a very small spot below tegulae.

Bembex primaaestate John, and Roh., n. sp.--Q. Length 14 mm.; clypeus rather irregularly punctured with shallow punctures; mandibles with a small tooth, about one-fourth from apex; front impunctate, or if punctured, very finely so; ocellar region with some distinct punctures; vertex and occiput straight; scape and first flagellar joint of about equal length, first joint of flagellum fully as long as 2 + 3; dorsulum with rather indistinct, close punctures, sparse on posterior part; scutellum with punctures more distinct and separated; mesopleura finely punctured; metathorax punctured as scutellum; anterior tarsi strongly flattened, base of first joint emarginate beneath; pulvilli large and somewhat bent toward apex; abdomen above rather strongly reticulate, apical segments punctured; ventral segments finely reticulate, with some large punctures. Black; clypeus, labrum, mandibles, except apex, which is piceous, scape and flagellum beneath, inner orbits to ocelli, intercellular spot, spot between antennae, a large spot on each side of first abdominal segment above, segments 2-5 with broad bands, which are dentate at the sides (second and third more strongly so), and spot on ventral segments 2, 3, 4, greenish-white; posterior orbits, prothorax except a spot in the middle, tegulae, spot above, a spot on each side of scutellum, line on postscutellum, large spot on mesopleura, spot above middle coxae, a large and small spot on metapleura, spot on trochanters, most of femora (more deeply so at sides), tibiae except a small spot beneath at apex, and tarsi, bright yellow; wings clear hyaline iridescent; head, thorax and abdomen with long white pile.

Hab.—Denver, Colo., 1889 (S. A. Johnson).

This species runs in Fox's table (Proc. Acad. Nat. Sci. Phil., 1895, p. 354) to B. connexus Fox, but it is not that species. It probably is more closely related to B. spinolae or B. amoena, but may be separated from these species by the foregoing table.

STENIOLIA Sav.

Middle tibiae and tarsi simple; markings bright yellowish.

duplicata Prov.

Middle tibiae and tarsi dilated; markings greenish-white. obliqua Cress.

Steniolia duplicata Prov.

Two females, Cortez, Col., Aug. 10, 1903; female, Boulder, Col., Sept. 7, 1907 (Roh.). We have also seen this species from Las Cruces, New Mexico, Aug. 30th, at fls. of Solidago canadensis (Townsend). This species has so far only been found on the plains. It is probably a southern form, finding its northern limit in Colorado.

Steniolia obliqua Cress.

Male and female at Florissant, Col., June and July, some at fls. of Edwinia americana (Roh.); Ward, Col., July, 1905, at fls. of Gilia (Ckll.); Wet Mountain Valley, Custer Co., Col. (Ckll.). This is the most common Bembicid in the mountains. So far it is not been reported from the plains.

STICTIA Illiger.

Males.
Middle femora smooth beneath; pulvilli distinct; second ventral abdo-
minal segment without spines beneath pectifrons Sm.
Middle femora carinated or spined beneath
1. Second ventral segment unarmed; pulvilli distinct speciosa Cress.
Second ventral segment with two small tubercles
2. Pulvilli large, distinct; larger; femora mostly black emarginata Say.
Pulvilli small, indistinct; femora black at base only; smaller.
pulchella Cress.
Females.
Pulvilli small, indistinct (anterior wings beyond third abdominal seg-

ment) pulchella Cress.

1. Dorsulum with a U-shaped yellow mark (legs mostly yellow).

speciosa Cress.

2. Femora largely black; metanotum black; larger . . emarginata Say. Femora mostly yellow; metanotum in part yellow; smaller.

pictifrons Sm.

Stictia pictifrous Sm.

Female, Livermore, Col., July 8, 1900.

Stictia emarginata Say.

Female, Livermore, Col., July 15, 1900.

Stictia speciosa Cress.

Female, Sterling, Col.; female, Lamar, Col.

Stictia pulchella Cress.

There are no specimens of this species in the collection, but it has been reported from Colorado by Fox, Cresson and Ashmead.

Synopsis and Bibliography of California Siphonaptera.

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The science of preventive medicine is growing apace with the commercial aggrandizement of the tropics and sub-tropics. It is leaving a profound impression on the very vitals of their economics. At present the Pacific metropolis, San Francisco, is in the throes of a sanitary upheaval conducted under the efficient guardianship of the greatest of exponents of preventive medicine, the U. S. Public Health and Marine Hospital Service. The campaign is a reactionary movement against the inroads of the dreaded oriental plague. Science has pointed its finger at the flea as the specific carrier of the pest germ.

The recent epidemic has given the flea a recognition which makes it pre-eminently notorious among insect foes. The following synopsis covers the species recorded in California. There are two species discovered on rats in San Francisco by Past Assistant Surgeon Fox, of the U. S. Public Health and Marine Hospital Service, which have not as yet been described. Dr. Fox is also responsible for the finding of *C. ignotus* on the California gopher. The rat fleas herein recorded have been collected by the writer during an inspection of over two thousand rats from the San Francisco Bay region.